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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/562,176	12/23/2005	Tetsujiro Kondo	279988US6PCT	1359
22850	7590	09/24/2008		
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER NEWMAN, MICHAEL A	
			ART UNIT	PAPER NUMBER
			2624	
			NOTIFICATION DATE	DELIVERY MODE
			09/24/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/562,176	Applicant(s) KONDO ET AL.	
	Examiner MICHAEL A. NEWMAN	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 9th, 2008 has been entered.

Response to Amendment

2. The amendment filed on June 9th, 2008 has been entered.
3. In view of the amendment to the claims, the amendment to claims 1, 3, 5 and 6 is acknowledged.

Response to Arguments

4. Applicant's arguments filed on June 9th, 2008 have been fully considered but they are not persuasive.
- a. In page 7 and 9 of the Remarks , with regards to the rejections of claims 1, 3, 5 and 6 under 35 U.S.C. 103 over Buckler et al. (U.S. Patent No. 5,030,984), "Buckler", and Kanbara (U.S. Patent No. 5,689,737), "Kanbara"; Applicant's Representative submits that the combination does not the newly added limitations of the claims. Specifically, Applicant's Representative submits that

neither Buckler or Kanbara teach that the normal equation includes a number of equations from the first equation and the second equation which is greater than or equal to a number of pixels without said movement blurring occurring. The Examiner *respectfully* disagrees. As correctly pointed out by Applicant's Representative, Buckler ultimately does solve a system of two linear equations shown in column 7 lines 20 – 35. However, as shown in figure 6 and discussed in column 8 lines 28 – 42, the system is actually populated by a plurality of the 'first equations' equations, shown in column 6 lines 64 – 66, solved for a plurality of pixel locations. Admittedly, Buckler suggests that in order to simplify hardware, a 'pixel skipping' scheme can be used such that the set of equations is computed only for every 'n-th pixel'. However, the examiner respectfully submits that one of ordinary skill in the art would recognize that although such a simplification scheme results in lowered processing costs, it also comes at a price of lowered resolution and accuracy of the motion detection. Thus, it would have been obvious to one of ordinary skill in the art, given advances in processor efficiency or an application-specific need for higher accuracy, to compute the equations shown in figure 6 for every pixel in the image. Such a modification would result in the system of equations having *at least* as many equations as there are pixels. Because Buckler does teach the aforementioned limitation, Kanbara does not need to also teach it under 35 U.S.C. 103.

Given this reasonable interpretation of the prior art and the claims, the Examiner *respectfully* insists that the rejections set forth below are proper.

Claim Objections

5. Claim 6 is objected to because of the following informalities:
 - a. Line 2 of claim 6 recites, “a processing region setting unit configured to *said* a processing region within ...” The word “said” appears to be a typographical error meant to be “set”.
6. Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
8. Claims 1 – 3, 5, 6 and 7 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
 - a. Lines 20 and 21 of claim 1 recite: "... the second equation which is greater than or equal to a number of pixels without said movement blurring occurring;" *The* number of the pixels without said movement blurring occurring, is an inherent property that does not require explicit antecedent basis within the claim. However, as currently recited, it is unclear as to whether the limitation refers to the inherent ‘total number’ of pixels without movement blurring occurring or any

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number (such as a subset of, perhaps, two pixels). Similar language is found in claims 3, 5 and 6. The claims do not clearly set forth the bounds of the invention and are therefore indefinite.

b. Lines 4 – 6 of claims 2 and 7 recite: “..., and a second equation wherein the difference of the pixel value of each pixel wherein said movement blurring is not occurring.” The limitation appears to be incomplete. Based on the independent claims, the second equation constrains a relation between each of the pixels without movement blurring occurring. It is clear that in claims 2 and 7, “the difference” is the relationship, but it is unclear as to how the second equation further constrains “the difference”. Based on at least paragraphs 1317 – 1319 of the published application, it appears as though “the difference” can either be constrained to zero or to some “smoothly changing” value. The claims fail to clearly set forth how either of the two constraints characterizes “the difference” or even that “the difference” ‘is characterized’ at all by the second equation. The claims do not clearly set forth the bounds of the invention and are therefore indefinite.

Claim Rejections - 35 USC § 103

9. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

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10. Claims 1 – 3, 5, 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckler et al. (U.S. Patent No. 5,030,984) in view of Kanbara (U.S. Patent No. 5,689,737). Hereinafter referred to as Buckler and Kanbara, respectively.

a. Regarding claims 1, 3, 5 and 6, Buckler teaches a signal processing device comprising: processing region setting means for setting a processing region (**Buckler Col. 10 lines 16 – 24**) within image data wherein a light signal of the real world is projected on a plurality of pixels, each having a time integration effect (**Buckler Fig. 2 element 16 – Col. 5 lines 11 – 16**) [**Note that the CCD sensor, having pixels, accumulates/integrates outside light at a period of time corresponding to the time the camera shutter is open**], and a portion of the continuity of the light signal of the real world is lost (**Buckler Col. 6 lines 19 – 21**) [**Note that the gradient, corresponding to image changes, indicates a loss of continuity (due to edges or object features)**]; movement vector setting means for setting movement vectors for an object within said image data corresponding to the continuity of the light signal of the real world, wherein a portion of the continuity of said image data is lost (**Buckler Fig. 1 element 26 – Col. 6 lines 19 – 25 and 42 – 44**); model generating means for modeling the relation between the pixel value of each of the pixels within said processing region and the pixel value of each of the pixels without movement blurring occurring, assuming that the pixel value of each of the pixels within said processing region is a value wherein the pixel value of each of the pixels without movement blurring occurring which correspond to said object is integrated while

shifting corresponding to said movement vector (**Buckler Col. 6 lines 19 – 25 and 42 – 44**) [**Note that the relation/displacement in regions with intensity changes is modeled by motion vectors of the optical flow field**]; normal equation generating means for generating a normal equation using a first equation wherein the pixel value of each of the pixels within said processing region is substituted into a model generated by said model generating means (**Buckler Col. 6 line 63**) [**Note that the equation for f_x and f_y is calculated for a plurality of measured pixels, as shown in figure 6**], and a second equation which constrains the relation between each of the pixels without said movement blurring occurring (**Buckler Col. 6 line 29**) [**Note that the constrain on the derivative with respect to position and time to be 0 corresponds to desired pixels without displacement change or motion**]. Buckler however, teaches that in order to simplify hardware, a 'pixel skipping' scheme can be used such that the set of equations is computed only for every 'n-th pixel' (**Buckler Col. 8 lines 15 – 18**). As such, Buckler **does not explicitly recite** that the normal equation includes a number of equations from the first equation and the second equation which is greater than or equal to the number of pixels without said movement blurring occurring. However, it is extremely well known in the art that although any simplification scheme which processes only a subset of the data results in lowered processing costs, it also comes at a price of lowered resolution and accuracy. Therefore, it would have been obvious to one of ordinary skill in the art given advances in processor efficiency or an application-specific need for

higher motion estimation accuracy, to compute the equations shown in figure 6, in Buckler, for every pixel in the image. Such a modification would result in a system of equations having *at least* as many equations as there are pixels.

Buckler further teaches that the calculated motion vectors can be stored in the memory of the camera and used a later time in a restoration process (**Buckler Col. 6 lines 10 – 16**). However, **Buckler fails to teach** and actual world estimating means for estimating a pixel value of each pixel wherein said movement blurring is not occurring, by computing said normal equation which is generated by said normal equation generating means. **Pertaining to the same field of endeavor, Kanbara teaches a shake detection system for a camera in which displaced pixels are realigned to the proper positions based on detected movement coordinates (Kanbara Col. 3 line 62 to Col. 4 line 5). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the resulting motion vectors generated by Buckler to correct the blur due to movement, as suggested by Buckler, by pixel realignment as taught by Kanbara in order to improve the image quality by removing effects of blurring, shaking, etc.**

- Regarding claim 5, Buckler teaches embodying the above-discussed process in program code to be executed by a computer (**Buckler – “Appendix A” – Cols. 11 to 18**).

b. Regarding claims 2 and 7, Buckler as modified by Kanbara with regards to claims 1 and 6, further teaches that said normal equation generating means

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generates a normal equation using a first equation wherein the pixel value of each of the pixels within said processing region is substituted into the model generated by said model generating means **(Buckler Col. 6 line 63) [Note that the equation for f_x and f_y is calculated for a plurality of measured pixels, as shown in figure 6]**, and a second equation wherein the difference of the pixel value of each pixel wherein said movement blurring is not occurring **(Buckler Col. 6 line 29) [Note that the derivative in x and y with respect to time measures the difference of pixel values (as set by the definition of a derivative), and setting it to 0 requires that those pixels do not exhibit change or displacement]**.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. Sun (U.S. Patent No. 7,164,800) teaches blurring motion estimation by solving an over-determined system of equations.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL A. NEWMAN whose telephone number is (571)270-3016. The examiner can normally be reached on Mon - Thurs from 9:30am to 6:30pm (EST).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir A. Ahmed can be reached on (571) 272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

M.A.N.

/Samir A. Ahmed/
Supervisory Patent Examiner, Art Unit 2624